SUNNYVALE WATER POLLUTION CONTROL PLANT
TOUR STUDY GUIDE (Answers)

1. Why is sewage treated before being discharged to the Bay? To protect human health and wildlife habitat
2. Why is it necessary to speed up nature's processes through the treatment plant? Because nature can't keep up with so many people using the water
3. What types of pollutants do Sunnyvale homes and businesses discharge into the sewer? (Name at least five.) Food, soaps, hair, toilet waste, cooking grease, chemicals, industrial by-products, pesticides, household products, cigarettes, etc…
4. How many millions of gallons of water enter the plant in an average 24-hour period? 16-21 million gallons per day
5. What is the diameter of each of the two pipes bringing sewage into the plant? 48 inches (4 ft.) How deep underground are they? Approximately 30 ft.
6. What are the colors of pipes in the plant that carry the following things?
   a. methane gas yellow b. sludge black c. scum brown d. electrical orange
   e. compressed air green f. water blue
7. How many engines in the PRIMARY BUILDING pump water up to ground level? Usually two of the three, because one is for back-up
8. What does the CHANNEL MONSTER do in the first step of PRIMARY TREATMENT of sewage? Grinds up the largest pieces of waste
9. What is the reason for adding compressed air into the GRIT CHAMBERS? It decreases the density of the water and causes the heaviest waste (grit) to sink to the bottom
10. What are examples of "GRIT"? Sand, gravel, metal particles, coffee grounds, seeds
11. What happens to GRIT after it is removed? It is rinsed off and taken to a landfill
12. What happens in the SEDIMENTATION BASINS when the water moves very slowly? The SLUDGE (heavy materials) sinks to the bottom and the SCUM (lighter materials) floats to the top
13. Where do SLUDGE and SCUM go once they are removed? To the four digesters
14. What happens in the DIGESTERS? ANAEROBIC BACTERIA consume the organic materials
15. What parts of the human body do the DIGESTERS mimic? The human stomach and intestines At what temperature should the scum and sludge in the digesters be kept? 100 degrees Fahrenheit
16. What gas is produced in the DIGESTERS? Methane What do we use it for? To run the pump engines and to generate electrical power
17. What is the environmental benefit of using it instead of flaring it? It keeps the CO2 out of the atmosphere and we use less energy from PG&E
18. What are the treated solids removed from the DIGESTERS called? Biosolids

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Plant Tour Study Guide Answers continued

19. What is the purpose of the slits in the tiles on the BIOSOLIDS DRYING BEDS? To allow the water to drain through for further treatment
20. How long do the BIOSOLIDS dry out on beds? 3-5 days
21. What are BIOSOLIDS used for? Landfill cover, instead of using valuable crop soil
22. Where does the water go for SECONDARY TREATMENT to naturally remove dissolved solids? To two ponds totaling 440 acres
23. How long, on average, does the water remain in the ponds? 33 days
24. What organisms in the ponds consume most of the dissolved solids and what is added as a result? Algae
25. What is the reason for removing dissolved solids and nutrients in SECONDARY TREATMENT? They cause algae to grow into a thick mat on the surface which suffocates everything in the water underneath
26. What is a by-product of ALGAE growth? Ammonia
27. What is the purpose of TERTIARY TREATMENT? To remove ammonia, algae, and harmful bacteria
28. Where does the water pumped up from the ponds go to begin TERTIARY TREATMENT? To the three FIXED GROWTH REACTORS (FGR's)
29. What happens in the FGR's when water trickles down the SLIME GROWTH walls? Ammonia is converted to less harmful nitrates
30. What two substances are added in the AIR FLOTATION TANKS to cause the algae to clump and float to the surface for removal? POLYMER (a sort of glue) and COMPRESSED AIR
31. What are the names of the materials in the dual MEDIA FILTERS? Coal, sand, and a base of pea gravel
32. Why does the water wind its way slowly through the CHLORINE CONTACT CHANNELS? To allow enough exposure time to kill remaining germs and pathogens
33. How do we remove CHLORINE later and why? By adding sulfur dioxide to neutralize it because it is harmful to plants and animals
34. How safe is the treated sewage water at this stage? OK for wildlife in the Bay, boating, swimming, etc., but NOT DRINKING
    What is the name of the treated sewage water that is not discharged into the Bay, and what is it used for? Recycled water, and it is used for irrigating landscapes and filling decorative ponds and fountains
35. What color are the pipes that distribute recycled water? Purple
36. Do you think it is necessary to have a sewage treatment facility? Yes Why or why not? If we didn't, very polluted water would be discharged into the Bay making it unhealthy for humans and wildlife